on the time between apparent immersion and disappearance, and investigates a mathematical formula, in which the supposed direct and indirect effects of aberration are combined, for determining the secular aberration of the star, and the amount of the difference of refraction for the moon and star.

IV. On the Longitude of the Honourable East India Company's Observatory at Madras. By T. G. Taylor, Esq.

The want of an accurate determination of the Longitude of the Madras Observatory has been greatly felt, both in an astronomical and a geographical point of view. In the former case, any error in the value assumed in the comparison of the places of the moon and planets with the tables, necessarily leads to seriously mischievous results; and in the latter, the triangles in the great trigonometrical survey of India depend for their zero upon the meridian passing through the Observatory; — the inquiry must therefore be considered one of singular importance. Mr. Goldingham, the predecessor of Mr. Taylor, had determined the longitude from no less than 230 observations of the eclipses of *Jupiter's* first and second satellite, and, before a result derived from so large a number of observations could be safely disputed, it seemed desirable to meet the inquiry with at least something like a corresponding number of observations.

The observations of moon-culminating stars were begun in 1831, on the erection of the present five-feet transit instrument, and the longitude, resulting from the observations of the first year as determined from the corresponding observations at Greenwich and Cambridge, was $5^h\ 21^m\ 3^s{\cdot}7$ or about 5^s less than the value assigned by Mr. Goldingham. At that time Mr. Taylor was not inclined to give to results obtained from moon-culminating stars that degree of credit which later experience has shewn them to deserve, from considerations connected with the probably varying error of the observations of the moon's limbs, but, as far as the present observations go, it appears that this error must be confined within narrow limits, since the semi-diameter of the moon, as measured at Madras, does not differ above half a second of space from that observed at Greenwich, Cambridge, Edinburgh, and Hamburg. Mr. Riddle, at the suggestion of Mr. Baily, undertook the reduction of the observations of the corresponding moon-culminating stars for the years 1834–1837, and the results are given in the twelfth volume of the Society's *Memoirs.*

The formula employed by him is precisely the same as that which has been used by Mr. Taylor, both in the previous as well as the present results; but there are one or two circumstances in which the treatment of the observations differs. In cases in which the full moon has happened in the interval between the moon's transiting the meridian of the Madras and the Western Observatory, it has sometimes happened that the first limb of the moon has been observed at Madras, and the second limb at the Western

Observatory; in those cases Mr. Riddle has computed the time of passage of the moon's semi-diameter from the semi-diameter given in the *Nautical Almanac*, while Mr. Taylor has rejected such cases: again, in taking the means, Mr. Riddle has given to each result a weight equal to the number of stars observed, whereas Mr. Taylor has made use of a table of weights depending upon the square root of the number, the rapidity of change of the moon's right ascension, and the relative accuracy of observations of the moon or stars.

Mr. Taylor also, having to discuss several observations of the second limb of the moon, has thought it necessary to separate these from observations of the first limb, and to treat them distinctly.

Mr. Taylor has, in the present paper, given the recomputed results for 1831–1833; so that Mr. Riddle's paper, with the present one, exhibits each single determination from corresponding observations at Greenwich and Cambridge, from 1831 to the end of 1844; and at Edinburgh, from the commencement to the end of 1839. The Hamburg observations have been taken from the *Astronomische Nachrichten*, Nos. 503, 504, and 508. To reduce each series to Greenwich, the longitudes of Cambridge and Edinburgh have been taken from the *Nautical Almanac* for 1845, and that of Hamburg from the *Connaissance des Temps* for 1840.

Finally, from 442 observations of the moon's first limb, the resulting longitude of Madras is $5^h\ 20^m\ 56^s{\cdot}38$ east, with a probable error of $\pm\ 0^s{\cdot}23$; and from 86 observations of the second limb, the result is $5^h\ 20^m\ 58^s{\cdot}19$, with a probable error of $\pm\ 0^s{\cdot}57$. Or, for the present, the most probable value is, $5^h\ 20^m\ 57^s{\cdot}28$.

V. On the Brahmin Zodiac. By W. W. Boreham, Esq. Communicated in a Letter to the Secretaries.

"I send you a rubbing from an engraved zodiac on a small silver bowl, which came into the possession of a relative of mine through the late Captain Taynton, who took it from the tent of a Burmese officer during the late war in that country.

"I cannot say that the bowl itself possesses any great antiquity; but the engraving may be regarded as traditionary evidence of the ancient Brahmin zodiac, and as such, possesses an interest.

"The Indian zodiac is well known, and engravings from it are not uncommon; but the Brahmin version of it is, I believe, not so generally given in works on the subject. Its peculiarity appears to consist principally in the retention of the fish and omission of the goat in *Capricornus*: it is alluded to by Dupuis in Lalande's *Astronomie*. The reverse of this is observed in the Greek zodiac.

"There are other minute peculiarities, but as they may be the result of the engraver's fancy I will not dwell upon them, merely observing that the fish in *Capricornus* (if it be one) does not appear